GOLDSTEIN & RUSSELL, P.C.

August 13, 2012

Hon. Jack B. Weinstein
United States District Court
Eastern District of New York
225 Cadman Plaza East
Brooklyn, NY 11201

Subject: *United States v. DiCristina*, Case No. 11-cr-414 (JBW)

Dear Judge Weinstein,

We appreciate the opportunity to submit this short letter and enclosed Supplemental Report to address the Government's belated assertion that Defendant has failed to prove that poker is a game of skill.

I.   Dr. DeRosa's Criticisms of Dr. Heeb's Statistical Analysis Are Unpersuasive

The Government's witness, Dr. David DeRosa, acknowledges that he is not an expert in poker or games (DeRosa Hrg. Tr. 6), and that Dr. Heeb is such an expert (*id.* 32). It is therefore significant that Dr. DeRosa's report did not attempt to refute four bases for Dr. Heeb's opinion that are based on his poker expertise: (1) poker involves a large number of complex decisions, which allow players of varying skill to differentiate themselves (Heeb Rpt. ¶ 9); (2) many people play poker for a living and consistently win money over time (*id.* ¶ 10); (3) players who obtain superior results with other starting hands tend to obtain superior results with any given hand, indicating that the players' abilities, and not the cards, are responsible for the results (*id.* ¶ 11); (4) the published studies are all consistent with his conclusions (Heeb *Daubert* Tr. 40-41; *see* Def. Hrg. Exh. 1).

Regarding the studies in particular, Dr. DeRosa acknowledged (i) that empirical studies are essential in this field (DeRosa Hrg. Tr. 42) and (ii) that he had no familiarity with the relevant literature (*id.* 44). The studies in the record uniformly show that poker is not a game of chance. Hope & McCulloch analyzed over 100 million poker hands to show that over 75% of hands are resolved without the cards ever being revealed, and even in the minority of hands in which the cards are revealed, the winner is often not the player who was dealt the strongest hand. The study establishes that the players' decisions (skill) determine the outcome in the vast majority of hands. A study by noted economist Steven Levitt – of the University of Chicago where Drs. DeRosa and Heeb both studied – concluded from empirical data that skill, not chance, determines the outcome in poker. A study by DeDonno and Detterman showed that people can be taught to play poker, and that they improve over time. And multiple studies

utilized simulations of poker to assess the influence of skill; all of them concluded that skill predominates over chance in determining poker outcomes.

Dr. DeRosa's report addressed none of those facts and authorities. The report raised valid questions about some of Dr. Heeb's other proofs, but as discussed below, the answers to those questions all favor Defendant.

Dr. DeRosa asserted first (DeRosa Rpt. ¶¶ 20-24) that poker is not a game of skill because roughly 90% of PokerStars players are predicted to lose money. That critique lacks merit for five reasons.

First, in many skill contests, most players lose (including losing money). In chess tournaments, many skilled competitors pay entry fees, but only the top few receive prizes, which means that the vast majority of chess players lose money by playing. *See, e.g.*, United States Chess Federation, 113th Annual United States Open Chess Championship, http://www.uschess.org/tournaments/2012/usopen/ (setting the prize structure for the 2012 United States Open Chess Championship, and explaining that with 500 projected entries, there would be 39 tournament prizes – for the top 8 in the open division, and the top 4 in each of 7 classes, and the top 3 unrated players – as well as a few lifetime achievement prizes). In Olympic sports, all of the athletes are highly skilled, but only three competitors per event win a prize. The fact that players lose thus does not prove that they are unskilled, and it does not shed light on the key question, which is what causes some players to win and others to lose. Defendant argues that if more-skilled players consistently defeat less-skilled rivals, then skill determines the outcome of the game, regardless of the number of winners.

Second, the fact that only a minority of players are expected to win actually shows that poker is a game of skill. Dr. Heeb's Supplemental Report explains (¶ 22) that in fair games of chance (*i.e.*, games of chance with fair odds, such as coin tossing) the number of winners and losers will be essentially equal. On the other hand, in fair games of skill, the top players will win disproportionately, using skill to distinguish themselves from the majority of their peers. The skew in results shows that poker is more a game of skill than chance.

Third, even though only a small percentage of players (approximately 8.5 percent) were expected to win, the study of the $5/$10 game included 45,467 players. Consequently, a large number of individuals (over 3800) still were predicted to earn a profit in this specific subset of poker games alone. Other players earn profits in other games.

Fourth, unlike a game of chance, the distribution of winners in poker is not immutable. The players who expect to lose do not face unfavorable odds. Rather, they lose because they make mistakes and poor decisions. The fact that it is possible to alter one's outcomes by making mistakes demonstrates that poker is a game of skill – it shows that a lack of skill matters. (DeRosa Hrg. Tr. 93) Another such fact is that these players can change their outcomes by becoming more skilled. They can study, practice (including by attending poker schools), and improve until they, too, profit. That is not true for games of chance. No amount of study can transform a losing slot machine player into a winning slot machine player – instead, the machine will always pay out at a set rate, and chance alone will determine whether a given player wins or loses.

Finally, as Dr. Heeb testified (DeRosa Hrg. Tr. 100), the small number of winners is heavily influenced by the "rake" (*i.e.*, fee) that all players (both winners and losers) pay the website for providing the game. That fee covers, *inter alia*, the site's expenses in providing computer systems, security, support, and advertising. Dr. Heeb has conducted a further analysis showing that with the rake eliminated a higher proportion of players would expect to profit. (Heeb Supp. Rpt. ¶¶ 7-9) Importantly, while the rake makes it more difficult for players to profit in poker, it does not alter whether the game is one of skill or chance. As discussed above, the fee and prize structure of a chess tournament does not render it a contest of chance, and the same is true of poker.

Dr. DeRosa argues next (DeRosa Rpt. ¶¶ 33) that Dr. Heeb's data shows statistical significance only after more hands than are ordinarily played in a single session, though he simultaneously disclaims any expertise in the question of how often players play or for how long (DeRosa Hrg. Tr. 36). That criticism is unfounded. Poker players frequently play large numbers of hands (Heeb Supp. Rpt. ¶¶ 12-13), and Dr. Heeb explained that he simulated large numbers of hands in his Report is to prove that skill predominates over chance in poker; with that fact proved, poker remains a game of skill in even a single hand. (DeRosa Hrg. Tr. 79; Heeb Supp. Rpt. ¶ 11) Thus, in a single hand a player dramatically affects his results by making the decision whether to fold, call, bet, or raise at every stage of the hand's play.

In his oral testimony, Dr. DeRosa emphasized that a poker player may play only one hand, and then immediately leave the game. (*Id.* 27) But as Dr. Heeb testified from his expertise in poker (*id.* 78), and the Court recognized (*id.* 27), that scenario is "unrealistic." The proper measure of a game's skill must account for how the game is ordinarily played. Even the casual players at the Warehouse played for six or more hours at a time. (Trial Tr. 59 (witness states that games often ran from 10 PM until 6 or 7 AM); *id.* 112 (undercover officer testified that the games typically lasted six hours and longer)).

Dr. Heeb's testimony proves that over a reasonable amount of time, more-skilled players defeat less-skilled players with overwhelming regularity. His Supplemental Report (at ¶¶ 11-12) confirms that this conclusion holds with respect to "casual players" and non-professionals who would play in a game like the one in this case.

Dr. DeRosa's third major argument focuses on one of Dr. Heeb's charts – his Figure 3, showing winners and losers in $1/$2 poker stakes. The point of Dr. Heeb's figure was that "many people make a living playing poker and win consistently over time." Heeb Rpt. ¶ 38. He included the chart to show "that players can and do win consistently and earn a living playing poker." *Id.* ¶ 39. And indeed, the chart proves the exact point for which it was offered. It shows that, even *after* the rake charged by PokerStars and at the low stakes $1/$2 game, top players make between $50,000 and $90,000. (Heeb Rpt. ¶ 41)

Dr. DeRosa responded by creating a similar graph for players flipping coins, and argued that his chart shows that even in games of pure chance, it is possible to identify winners after a large number of trials. Dr. DeRosa's simulation only proves Dr. Heeb's point. The luckiest of Dr. DeRosa's 1000 coin tossers after 100,000 simulations is ahead by 1100 tosses. (DeRosa Rpt. 14) Analogizing the stakes to the $1/$2 poker game, if the outlier coin tosser won $2 every toss,

he would win only $2200. And if a 5% rake were charged (as on PokerStars), *none* of the coin tossers would make any profit.

Dr. DeRosa explained that in his coin-tossing simulation, the winners were only apparent in hindsight. (DeRosa Hrg. Tr. 62) Thus, no person would ever attempt to make a living as a coin tosser, because the player could not know *ex ante* whether he would be a winner, and the player could never improve in skill. Remarkably, Dr. DeRosa refused to admit that there can't be professional coin tossers. (*Id.* 48)

Dr. DeRosa pointed out that in that one respect Dr. Heeb's chart resembled the coin toss chart: it identifies winners only in hindsight. (DeRosa Rpt. ¶ 47) Dr. Heeb acknowledged the point, but explained that the illustration was never intended, on its own, to prove skill. (DeRosa Hrg. Tr. 84; Heeb Supp. Rpt. ¶ 15) Dr. Heeb showed skill in poker through other methods, all of which illustrate that poker and coin flips have virtually nothing in common.

From his expertise in poker, Dr. Heeb explained that there are many professional poker players who consistently make their living year after year by playing the game. (Heeb Rpt. ¶¶ 9, 82-83) This fact was never controverted.

Then, through statistical analysis, Dr. Heeb then compared players' performance with each of the 169 starting hands to that player's performance with every other starting hand. (Heeb Rpt. ¶¶ 11, 43-51) He explained that if chance controlled outcomes in poker – as it controls outcomes in coin flips – then a player's success with any given hand would not correlate with success with other hands. The data, however, showed a strong correlation, and constituted an independent basis for Dr. Heeb's opinion, which Dr. DeRosa's report did not answer.

Dr. Heeb then applied multiple regression analysis to one group of players' behaviors and results to construct a "skill index." (Heeb Rpt. ¶¶ 11, 54-57) He used that index to predict how an entirely different group of players would perform, designating half of the players as "more skilled," and the other half as "less skilled." (*Id.* ¶ 58) His results showed that controlling for the players' cards, more skilled players won more money with the same hands than less skilled players. (*Id.* ¶ 67-68) Since the cards are identical in those cases, that finding necessarily shows that skill produces favorable outcomes. Dr. DeRosa raised questions about the skill index, which have been answered in Dr. Heeb's Supplemental Report (¶¶ 19-20), and in Dr. Heeb's oral testimony (DeRosa Hrg. Tr. 89-91).

Dr. Heeb's Supplemental Report provides a further answer to Dr. DeRosa's criticism of the chart. Dr. Heeb has identified the top ten winners and losers "two-thirds" of the way through the data set and studied whether those results persist over time. They do: "winners" continue to win and "losers" continue to lose. (Heeb Supp. Rpt. ¶¶ 16-17) Again, as Dr. DeRosa admitted, such persistence would *not* occur in coin tosses and other games of chance. (DeRosa Hrg. Tr. 64) And indeed, Dr. Heeb prepared a graph which shows that in coin tosses, unlike poker games, winners do not persist. (Heeb Supp. Rpt. Fig. 3, Fig. 4)

Dr. DeRosa finally raises speculative allegations about the integrity of Dr. Heeb's data. (DeRosa Rpt. ¶¶ 59-62) At the hearing, Dr. Heeb explained, in detail, the mechanisms that he used to validate and process the data. (DeRosa Hrg. Tr. 70-73) Dr. DeRosa then appeared to

abandon his early critiques, and instead raised the possibility – without any basis – that the data, which comes from the online site PokerStars, might be tainted if PokerStars is cheating its players by revealing players' hands to certain of its confederates. (*Id.* 74-75) Dr. DeRosa is grasping at straws. PokerStars has never been accused of such conduct, the company is licensed and heavily regulated not only by the Isle of Man by also multiple European governments, and it has submitted its software to independent auditors to confirm its integrity; *see* PokerStars Software Security, http://www.pokerstars.com/poker/room/features/security/. Moreover, the United States government recently settled its case with PokerStars, and in the process sold to PokerStars the assets of one of its competitors, entrusting PokerStars to pay back players who had been victims of the competitor's fraud.

II.   The Evidence Shows that Chance Does Not Predominate Over Skill in Poker

At the conclusion of the hearing, the Court requested that Dr. Heeb consider whether there is statistical proof that skill predominates over chance and provide the precise data. (DeRosa Hrg. Tr. 97) Dr. Heeb's Supplemental Report provides the requested proof.

Figure 6 of Dr. Heeb's Supplemental Report shows that skill plays a greater role than chance in determining the outcome of poker, and that this fact is apparent after only 240 hands – a number that can easily be dealt in a single poker session in a room like the Warehouse. (Heeb Supp. Rpt. ¶ 29) In addition to examining the data regarding whether skilled players outperform their less-skilled counterparts, Dr. Heeb derived an equation that accounts for the role of skill in determining a particular result in poker. (*Id.* ¶¶ 22-23, n.6) That equation estimates the portion of a game controlled by skill based on the frequency with which more skilled players prevail.

Applying his equation to the data, Dr. Heeb's report concludes that after 240 hands, the top half of poker players outperform the bottom half 76% of the time, and skill determines the majority of that result. Over the same number of hands, highly skilled players (the top ten percent) prevail over low-skilled players (the bottom thirty percent) 88% of the time, with skill accounting for 77% of the result. (Heeb Supp. Rpt. ¶ 12, Fig. 6). After 900 hands (roughly four separate sessions), the top half prevails over the bottom half approximately 90% of the time, and the highly skilled players prevail over poorly skilled players 99% of the time. (Heeb Supp. Rpt. Fig. 6) Skill accounts for 81% and 98% of those results, respectively. Dr. Heeb also provided estimates after 300 and 3000 hands. In all of these cases, skill predominates over chance.

To be clear, the results described above do not mean that poker is a 75% game of skill over one session and a 90% game of skill over four sessions. Instead, as Dr. Heeb's report explains, "[p]oker is a game of skill on every hand that is played, but proving this statistically requires a sufficient number of hands." (Heeb Supp. Rpt. ¶ 11) Contests that are obviously games of skill illustrate the point. In Major League Baseball, for example, starting with 2007, the teams that made the playoffs in the previous season – and therefore could be regarded as highly skilled – beat teams that had failed to make the playoffs only 55.7 percent of the time. *See* Steven D. Levitt & Thomas J. Miles, *The Role of Skill Versus Luck in Poker: Evidence from the World Series of Poker*, NBER Working Paper 17023, at 13 (2011). To take an even more extreme example, in a single pitch of a baseball game, the less-skilled team will obtain a favorable outcome with even greater frequency. If one looked only at these isolated events, one might wrongly conclude that baseball is a game of chance. However, if one considers the long

run, then it becomes clear that skill predominates over chance in both baseball and poker, and that skill plays a crucial role in every play in baseball, and every hand in poker. (DeRosa Hrg. Tr. 77-78)

As a final note, Defendant urges the Court to be wary of the Government's approach to this question. The Government has never identified *any* method for separating the games that are "gambling" under the IGBA's independent definition from those that are not. Similarly, Dr. DeRosa was barely willing to acknowledge that games of skill exist at all. The Government's approach has instead been to try to poke holes in Defendant's methodology. It has failed, and ultimately, the Government manifestly has not established the poker is a game in which chance predominates over skill.

III.   Even if This Court Agrees with Each of Dr. DeRosa's Arguments, Defendant Would Prevail

In any event, Dr. DeRosa's report and testimony ultimately make it more clear, not less, that Defendant's Rule 29 motion must be granted. Dr. DeRosa did not attempt to establish that poker is a game of chance – instead, all he even attempted to argue was that Defendant had not proved the opposite. Even in that endeavor, he only addressed some of Dr. Heeb's opinions. Indeed, with all of its resources and more than a month after Dr. Heeb testified, the Government has not produced any evidence – whether expert testimony or other proof – that chance predominates over skill in poker.

The rule of lenity requires the Government to establish that poker is clearly gambling under the IGBA. *United States v. Santos*, 553 U.S. 507, 514 (2008) (plurality opinion). Uncertainty is resolved in Defendant's favor. Under that standard, Defendant prevails even if the Court agrees with every point Dr. DeRosa made because Dr. DeRosa's assertions, taken at face value, do not provide the Court with any basis to conclude that chance predominates over skill in poker. Consequently, the law is not clear enough to put individuals on notice that this national pastime subjects them to federal felony punishment.

Respectfully submitted,

/s/ Thomas C. Goldstein

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